WQB "Wide Aperture Quad" for Main Injector

11 August 2005, 9:00 AM
IB2 conference room

Attendees: Linda Alsip, Bruce Brown, Weiren Chou, TJ Gardner, Hank Glass, Dave Harding, Vladimir Kashikhin, Ioanis Kourbanis, Bill Robotham, John Zweibohmer

Measurements

Dave and Hank showed graphs from a spreadsheet that Hank had prepared summarizing measurements on WQB001-0. Hank had measured the magnet with a shorter probe and showed that the recreated field in the central region agreed with the longer probe. Dave had added additional harmonic components to the field reconstruction. The initial plots used the 6-, 8-, 10-, and 12-pole coefficients. 14-, 16-, and 22-pole numbers are not measured directly, but Dave added in the 18-, 20-, and 24-pole. These are needed to reproduce the downturn in field at the edges that must happen and qualitatively agrees with Vladimir's calculation. Limitations from the probe/magnet geometry limit the coverage of the aperture.

Some harmonics are not measured, a factor that becomes critical where the field is significantly deviating from linear, as it is on the edge of the specified good field region. The field reconstruction is also expected to be good out to about 2/3 the probe radius. Using the shorter probe we could measure at more positions across the aperture and extract some higher multipoles by looking, for example, at B_6' and B_6". The single stretched wire measurement is the only way to access the interesting region near the edge of the aperture. Higher current measurements are critical.

The body-end separation measurements of WQB001 are currently under way on Stand A. WQB002 will be placed on Stand C to remove the power supply limit of about 3500 A, and undergo a thermal test before magnetic measurements start. The end field saturation is an especially interesting question.

Design

The crossover bus on WQB002 is 1.25" diameter copper in place of the previous 0.625". A third iteration of the bus could be considered if thermal measurements of 002 suggest it is needed.

Procurement

Procurement of additional pole shims has begun. New parts may be needed for the crossover bus.

Fabrication

WQB001 is at MTF.

WQB002 fabrication is complete and awaiting its turn at MTF.

WQB003 is assembled and welded. Manifolding will begin, but will delay at the crossover bus to await 002's thermal measurements.

WQB004 coil winding and core stacking is complete. The coils are awaiting impregnation.

WQB005 coil winding is in progress.

Schedule

The schedule has been revised to segregate magnet assembly in the roll-over fixture from manifolding and final work. The total duration of these two operations equal the original value of 15 days. Also, the 20 day test period will be done to WQB002, then the reworked 001 can be retested at high current. The schedule depicts completion of testing seven units by 11/1/05.

Additional:

The last of the beam tubes have return from having the ends trimmed after swaging. During leak testing in IB4 one tube will be measured for motion during evacuation.

The AD vacuum people are asking about the beam tube processing. On the advice of the vendor we specified KPC 820N as the cleaning agent. AD would like to know about the implications of this. TD's checks are for leaks, not outgassing. AD could do a residual gas analysis after pumping down a tube. TD will try to learn more about KPC 820N. Ultrasonic cleaning could still be done on the tubes for magnets after 003.

Next meeting: Hank will assess the status of the measurements and may call a limited meeting on 18 August 2005. Otherwise, the next scheduled meeting will be 25 August 2005 at 9:00 in the Industrial Building 2 conference room.